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Current Trends

Postservice Mortality Among Vietnam Veterans

The CDC has recently completed the first phase of the Vietnam Experience Study (VES), a comprehensive study of the health of Vietnam veterans. The VES is a historical cohort study in which the health of 9,324 Vietnam veterans is compared with that of 8,989 non-Vietnam veterans who served in Korea, Germany, or the United States during the Vietnam era. Eligibility for the study was limited to male U.S. Army veterans who first entered military service between 1965 and 1971, who served a single term of enlistment, and who were discharged alive in the enlisted pay grades E-1 through E-5. Participants were randomly selected from computerized lists of accession numbers taken from the military personnel files of Army veterans who were discharged during the relevant time period.

The VES has three components: an assessment of mortality; health interviews of living veterans; and a clinical, psychological, and laboratory evaluation of a random sample of those persons who completed the health interview. The mortality component is the portion of the VES that has recently been completed; a summary of this phase follows (*1*).

Several methods were used to determine the number of deaths occurring among Vietnam veterans after discharge from active duty and before January 1, 1984. The result was nearly complete ascertainment of the vital status for both cohorts. In addition to an analysis based on the cause of death as specified on each death certificate, a medical review panel independently assigned an underlying cause of death using information from supplemental sources. These sources included personal physicians as well as hospital records, autopsy reports, and coroner and law enforcement files. Causes of death were coded according to the Ninth Revision of the International Classification of Diseases (*2*).

The study indicated that veterans of service in Vietnam experienced a 17% higher rate of postservice mortality than veterans who served in Korea, Germany, or the United States. The most noteworthy pattern of overall mortality was the changing difference between Vietnam and non-Vietnam veterans over time. During the first 5 years after discharge, Vietnam veterans had a mortality rate 1.5 times higher than non-Vietnam veterans (Table 1). During the succeeding years, there was essentially no difference between the two groups. This pattern was generally consistent across most demographic and military subgroups of veterans. When the data were stratified by type of military unit and military occupational specialty, the relative risk of postdischarge mortality for those less likely to have been in combat was similar to the risk for those who were more likely to have been in combat.

External causes, which include both intentional and unintentional injuries, accounted for most of the increased mortality in the early postservice period. Fatal injuries from motor vehicle crashes (MVC) were approximately two times more likely among Vietnam veterans than non-Vietnam veterans during this time (Table 2). A more detailed examination of MVC deaths

Mortality — Continued

did not indicate any particular factor that could explain the overall excess among Vietnam veterans. Data on the involvement of alcohol (available for 62% of MVC deaths) indicated that drinking did not account for this excess. Furthermore, the increased death rate was evident regardless of the time of day of the crash or the number of vehicles involved. Suicide and homicide showed similar increases in the early follow-up period, with both rate ratios being at or below 1.0 thereafter (Table 2).

Mortality from unintentional poisonings was elevated among Vietnam veterans throughout the follow-up period, although the number of such deaths was small (rate ratio [RR] = 2.5, 95% confidence interval [CI] = 0.88-6.92). Most of these involved the use of illicit drugs. When all drug-related deaths identified by the medical review panel were analyzed together (Table 2), the rate ratio between Vietnam and non-Vietnam veterans appeared to increase with the number of years since discharge. Furthermore, this excess was found almost exclusively among draftees; those assigned to tactical military occupational specialties; and those serving in Vietnam during 1968 or 1969, the years of heaviest combat activity.

TABLE 1. Number of deaths, person-years, and crude death rates/1,000 person-years among Vietnam and non-Vietnam veterans and rate ratios, by time since discharge — United States, 1965-1983

Years since discharge	Vietnam No. deaths	Vietnam Person-years	Vietnam Rate/1,000	Non-Vietnam No. deaths	Non-Vietnam Person-years	Non-Vietnam Rate/1,000	Rate ratio	(95% CI*)
≤5	110	46,350	2.37	73	44,747	1.63	1.45	(1.08-1.96)
6-10	72	45,855	1.57	74	44,233	1.67	0.94	(0.68-1.30)
≥11	64	35,692	1.79	53	32,350	1.64	1.09	(0.76-1.57)
All years	246	127,897	1.92	200	121,329	1.65	1.17	(0.97-1.41)

*Confidence interval.

TABLE 2. Numbers of deaths from specific causes among Vietnam and non-Vietnam veterans and unadjusted rate ratios, by time since discharge — United States, 1965-1983

Cause (Ninth Revision ICD*)	Time since discharge ≤5 years No. deaths	≤5 years Rate ratio	≤5 years (95% CI†)	≥6 years No. deaths	≥6 years Rate ratio	≥6 years (95% CI†)	All years No. deaths	All years Rate ratio	All years (95% CI†)
Motor vehicle injuries (E810-E825)	66	1.93	(1.16-3.22)	67	1.16	(0.72-1.87)	133	1.48	(1.04-2.09)
Other unintentional injuries§	23	1.05	(0.46-2.39)	39	0.89	(0.48-1.67)	62	0.95	(0.58-1.56)
Suicide (E950-E959)	25	1.72	(0.76-3.88)	32	0.64	(0.32-1.30)	57	0.98	(0.59-1.65)
Homicide (E960-E969)	18	1.52	(0.59-3.91)	33	0.78	(0.39-1.55)	51	0.99	(0.57-1.71)
Drug-related¶	18	1.21	(0.48-3.06)	22	2.01	(0.82-4.94)	40	1.58	(0.83-3.00)

*International Classification of Diseases.

†Confidence interval.

§Includes deaths from unintentional injuries, exclusive of deaths from motor vehicle crashes and unintentional poisonings.

¶Defined by medical review panel. Includes deaths due to drug dependence and abuse, unintentional poisonings by drugs, suicide by drugs and poisonings by drugs, intentionality undetermined.

Mortality — Continued

Circulatory system diseases were the only natural causes of death for which the mortality rate among Vietnam veterans differed from that among non-Vietnam veterans. As compared with non-Vietnam veterans, Vietnam veterans had a notable deficit in such deaths (RR = 0.5, 95% CI = 0.25-0.99).

For all causes of death except suicide, statistical adjustment for potential confounders such as age at discharge, race, military occupational specialty, and pay grade at discharge had little effect on the results. For suicide, adjustment increased the RR in the early post-service period from 1.7 to 2.5 (death certificate data).

Reported by Agent Orange Projects, Div of Chronic Disease Control, Center for Environmental Health, CDC.

Editorial Note: The intent of this study was to assess the effect of military service in Vietnam on subsequent mortality. The "Vietnam Experience" includes a wide variety of factors that could influence health. These include psychological stresses associated with war, infectious diseases prevalent in Vietnam, and exposure to the herbicide Agent Orange.

Previous studies of Vietnam veterans reveal a similar excess of mortality from external causes among Australian Vietnam veterans (*3*). Deaths from suicide, homicide, and unintentional poisoning occurred more frequently among Australian veterans who had served in Vietnam than among other Australian Vietnam-era veterans. Mortality associated with MVCs was not elevated overall, but data suggested an excess in the youngest age group.

Findings on mortality from external causes from four other proportional mortality studies of U.S. Vietnam veterans are not consistent with this CDC study (*4-7*). These four studies showed no significant increases in deaths from MVCs (*5*), suicide and homicide, or unintentional poisonings (*4*) among U.S. Vietnam veterans.

Whereas the CDC study revealed a continuing excess of drug-related deaths among U.S. Vietnam veterans, the only substance-related excess among Australian Vietnam veterans involved deaths from alcohol-related natural causes (*1*). These discordant findings may reflect differences in in-service use of drugs and alcohol. While the use of illicit drugs by American troops in Vietnam was reported to be heavy (*8,9*), drug use among Australian soldiers was reported to be uncommon. However, alcohol use was reported to be heavy among Australian soldiers (*3*).

The lower mortality from circulatory diseases among Vietnam veterans is unexpected and may be a by-product of the selection process for assignment to Vietnam, which may have included consideration of cardiovascular fitness established during basic or advanced training. An opposite result was found in the Australian study, where mortality due to circulatory diseases was 90% higher among Vietnam veterans than among non-Vietnam veterans (*3*). Various indexes of cardiovascular morbidity measured in the other components of the VES may help to further explain these mortality findings.

The CDC findings for external-cause mortality are similar to previous observations of post-service mortality in U.S. Army veterans serving in combat areas during World War II and the Korean War (*10*). In contrast, broader cross sections of World War II veterans, which included both men who had served in war zones and men who had not, did not show either a difference or a deficit in postdischarge traumatic deaths (*10,11*), as did non-Vietnam veterans in the CDC study. These findings suggest that the postservice excess of traumatic deaths among Vietnam veterans may not be unique to the Vietnam experience, but rather, may be a consequence of the unusual stresses endured while stationed in a combat zone. The pattern of drug-related deaths, however, may be more specifically linked to combat intensity rather than to the result of an across-the-board effect of the war experience.

The mortality assessment of Vietnam veterans presented here is an incomplete evaluation of the health experience of this group. Additional data on the present and past health status

Mortality — Continued

of living Vietnam veterans will be forthcoming from the health interview and laboratory and psychological evaluation components of the VES. Because this group of veterans has not yet reached the age at which chronic diseases have an important impact on mortality, continued monitoring of mortality among VES participants may provide additional insights.

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Epidemiologic Notes and Reports

Toxic Shock Syndrome Following Influenza — Oregon; Update on Influenza Activity — United States

Oregon. A case of toxic shock syndrome (TSS) following influenza has been reported to CDC. On December 11, 1986, a 13-year-old white female with fever, hypotension, and acute respiratory failure was seen at an Oregon hospital. Pertinent findings on physical examination included a temperature of 39 C (102 F); blood pressure of 60/0; evidence of upper airway obstruction; and conjunctival, palatal, and lingual hyperemia. A chest radiograph at the time of admission showed a bilateral increase in lung markings consistent with a diagnosis of early adult respiratory distress syndrome.

During the 24 hours following admission, the patient developed a diffuse, erythematous, sunburn-like rash and watery diarrhea. She required both intravenous fluids and vasopressors for treatment of severe hypotension. A diagnosis of toxic shock syndrome was considered and was supported by laboratory findings of thrombocytopenia (70,000/mm^3), renal insufficiency (creatinine level = 2.8 mg/dL, urea nitrogen level = 40 mg/dL), hypocalcemia (Ca = 5.9 mg/dL), and elevated levels of creatine kinase (12,000 U/L) and aspartate aminotransferase (367 U/L). *Staphylococcus aureus* was isolated from two tracheal aspirates obtained on the day of admission. Other studies, including vaginal cultures, blood cultures, and urine antigen testing, were negative for pathogenic organisms.

Toxic Shock — Continued

Although the patient's menstrual cycle had begun 6 days before admission, she had not used tampons or other intra-vaginal devices and was not sexually active. However, she had a history of a 4-day prodrome of an influenza-like illness consisting of fever (temperature = 40 C [104 F]), malaise, myalgias, sore throat, and substernal chest discomfort.

The patient was discharged following a 10-day hospitalization. On a follow-up examination 20 days after admission, full thickness desquamation of the palms and soles was noted. Testing of acute- and convalescent-phase sera revealed a rise in hemagglutination-inhibition antibody titer to influenza A(H1N1) from 32 on December 13 to 1,024 at the time of her follow-up examination on December 31.

United States. Outbreaks of type A(H1N1) influenza activity are continuing. For the week ending January 31, six western states* and Puerto Rico reported widespread outbreaks of influenza-like illness, and 19 states† and the District of Columbia reported regional outbreaks of influenza-like illness. This is the sixth week with more than 20 states reporting outbreak activity. The level of current activity is below the peak of the previous winter when 37 states reported outbreaks for 1 week in February.

Reported by M Brooks, MD, P Bennington, Northwest Kaiser Permanente, D McNeill, Oregon Public Health Laboratory, D Fleming, MD, LR Foster, MD, State Epidemiologist, State Health Div, Oregon Dept of Human Resources; State and Territorial Epidemiologists and State Laboratory Directors; Meningitis and Special Pathogens Br, Div of Bacterial Diseases, WHO Collaborating Center for Influenza, Influenza Br, Div of Viral Diseases, Center for Infectious Diseases, CDC.

Editorial Note: This 13-year-old girl's illness meets the case definition for TSS (*1*), which is caused by toxin-producing *S. aureus* in a susceptible host. The temporal relation between the child's illness and menstruation is most likely coincidental since no *S. aureus* was isolated from the vagina. The *S. aureus* isolated from the tracheal aspirates is the most likely cause of TSS in this patient. TSS associated with *S. aureus* respiratory infections has been reported previously (*2*). TSS following influenza was first reported last year during an epidemic of influenza type B (*3*). This is the first case of TSS following influenza reported to CDC this year and the first case reported following influenza type A(H1N1).

The occurrence of TSS following influenza may be coincidental, but *S. aureus* pneumonia as a complication of influenza is well documented (*4,5*). Physicians are encouraged to obtain cultures and serologies for influenza in cases of TSS following influenza-like illness or during influenza epidemics. Physicians who have seen patients with TSS following influenza-like illness are encouraged to report these cases through their local and state health departments to the Meningitis and Special Pathogens Branch, Division of Bacterial Diseases, Center for Infectious Diseases, CDC, Atlanta, Georgia 30333; telephone (404)329-3687.

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*Alaska, Idaho, Oregon, Texas, Washington, and Wyoming.

†Alabama, Arizona, Arkansas, California, Connecticut, Iowa, Kansas, Kentucky, Minnesota, Mississippi, Missouri, Nebraska, New Mexico, North Carolina, North Dakota, Pennsylvania, South Carolina, South Dakota, and Wisconsin.

Perspectives in Disease Prevention and Health Promotion

Sex- and Age-Specific Prevalence of Heavier Drinking in Selected States in 1985 — The Behavioral Risk Factor Surveys

Since 1984, several states have been collecting risk factor data from adults (>18 years of age) on a monthly basis as part of the Behavioral Risk Factor Surveillance System (*1*). The following analysis was based on the 22 states (including the District of Columbia) that collected data on alcohol consumption during 1985.

In this analysis, the prevalence of heavier drinking* was based on the percentage of persons who reported regularly having an average of two or more drinks (beer, wine, liquor)

*The category "heavier drinking" and its definition are taken from the National Institute on Alcohol Abuse and Alcoholism, which, for study purposes, classifies individuals as "abstainers" or "lighter", "moderate", or "heavier drinkers" (*1*).

(Continued on page 71)

TABLE I. Summary—cases specified notifiable diseases, United States

Disease	5th Week Ending			Cumulative, 5th Week Ending		
	Feb. 7, 1987	Feb. 1, 1986	Median 1982-1986	Feb. 7, 1987	Feb. 1, 1986	Median 1982-1986
Acquired Immunodeficiency Syndrome (AIDS)	234	207	N	1,875	1,046	N
Aseptic meningitis	74	66	90	424	386	433
Encephalitis: Primary (arthropod-borne & unspec.)	17	18	18	67	84	81
Post-infectious	2	3	1	3	6	6
Gonorrhea: Civilian	13,522	15,812	17,885	81,011	80,701	81,008
Military	237	239	425	1,658	1,284	2,049
Hepatitis: Type A	384	445	454	1,955	2,055	1,874
Type B	423	392	410	1,924	2,050	2,040
Non A, Non B	46	41	N	253	245	N
Unspecified	60	110	110	299	467	467
Legionellosis	5	21	N	55	55	N
Leprosy	8	-	1	24	27	16
Malaria	16	12	13	56	55	55
Measles: Total*	23	46	16	111	116	48
Indigenous	20	41	N	91	108	N
Imported	3	5	N	20	8	N
Meningococcal infections: Total	70	75	64	317	272	272
Civilian	70	75	64	317	272	269
Military	-	-	-	-	-	-
Mumps	430	43	61	1,210	215	301
Pertussis	35	24	22	160	154	115
Rubella (German measles)	-	2	7	20	23	35
Syphilis (Primary & Secondary): Civilian	553	616	616	2,908	2,383	2,649
Military	-	8	7	6	17	33
Toxic Shock syndrome	8	8	N	25	25	N
Tuberculosis	347	382	388	1,521	1,382	1,553
Tularemia	2	1	3	9	7	7
Typhoid fever	3	1	4	16	22	27
Typhus fever, tick-borne (RMSF)	1	1	1	6	5	6
Rabies, animal	45	77	77	273	381	381

TABLE II. Notifiable diseases of low frequency, United States

	Cum 1987		Cum 1987
Anthrax	-	Leptospirosis	2
Botulism: Foodborne	-	Plague	-
Infant	4	Poliomyelitis, Paralytic	-
Other	-	Psittacosis	7
Brucellosis (Mo. 1)	7	Rabies, human	-
Cholera	-	Tetanus	2
Congenital rubella syndrome	-	Trichinosis	2
Congenital syphilis, ages 1 year	-	Typhus fever, flea-borne (endemic, murine)	1
Diphtheria	1		

*Three of the 23 reported cases for this week were imported from a foreign country or can be directly traceable to a known internationally imported case within two generations.

TABLE III. Cases of specified notifiable diseases, United States, weeks ending February 7, 1987 and February 1, 1986 (5th Week)

Reporting Area	AIDS	Aseptic Meningitis	Encephalitis		Gonorrhea (Civilian)		Hepatitis (Viral), by type				Legionellosis	Leprosy
			Primary	Post-infectious			A	B	NA,NB	Unspecified		
	Cum 1987	1987	Cum 1987	Cum 1987	Cum 1987	Cum 1986	1987	1987	1987	1987	1987	Cum 1987
UNITED STATES	1,875	74	67	3	81,011	80,701	384	423	46	60	5	24
NEW ENGLAND	78	8	6	1	3,026	1,857	16	51	5	6	-	1
Maine	4	-	-	-	101	86	-	2	1	-	-	-
N H	3	1	-	-	47	37	2	3	-	-	-	-
Vt	-	-	1	-	17	25	-	3	1	-	-	-
Mass	34	7	3	-	1,132	743	9	41	3	6	-	1
R I	9	-	2	1	238	139	1	1	-	-	-	-
Conn	28	-	-	-	1,491	827	4	1	-	-	-	-
MID ATLANTIC	786	6	12	-	14,215	14,921	27	21	2	7	-	-
Upstate N Y	312	-	4	-	1,389	1,321	26	11	1	1	-	-
N Y City	310	1	3	-	8,936	9,843	1	5	-	6	-	-
N J	105	3	1	-	1,038	1,490	-	-	-	-	-	-
Pa	59	2	4	-	2,852	2,267	-	5	1	-	-	-
E N CENTRAL	116	8	22	-	8,987	10,996	18	33	9	-	2	-
Ohio	24	4	15	-	2,615	2,932	2	18	3	-	1	-
Ind	10	-	-	-	871	1,082	-	-	-	-	-	-
Ill	55	-	-	-	1,102	2,412	-	2	-	-	-	-
Mich	15	4	7	-	3,786	3,155	16	12	6	-	1	-
Wis	12	-	-	-	613	1,415	-	1	-	-	-	-
W N CENTRAL	15	1	1	-	3,437	3,805	13	12	1	-	-	-
Minn	6	-	-	-	583	590	5	1	-	-	-	-
Iowa	-	-	-	-	336	394	4	4	-	-	-	-
Mo	2	-	-	-	1,741	1,846	-	2	1	-	-	-
N Dak	-	-	-	-	18	38	-	-	-	-	-	-
S Dak	-	-	-	-	84	59	-	1	-	-	-	-
Nebr	4	1	1	-	189	152	-	4	-	-	-	-
Kans	3	-	-	-	486	726	4	-	-	-	-	-
S ATLANTIC	284	15	9	1	21,862	18,916	33	83	8	15	1	-
Del	6	-	1	-	301	309	-	1	-	-	-	-
Md	48	2	-	-	2,064	2,210	6	8	1	3	-	-
D C	38	1	-	-	1,378	1,685	1	2	-	-	-	-
Va	20	5	5	1	1,875	1,507	9	18	1	10	-	-
W Va	2	1	2	-	133	259	1	3	3	-	-	-
N C	17	-	1	-	3,466	2,497	2	10	-	-	-	-
S C	6	-	-	-	2,370	1,808	1	8	3	-	1	-
Ga	25	2	-	-	3,648	3,365	4	20	-	1	-	-
Fla	122	4	-	-	6,627	5,476	9	13	-	1	-	-
E S CENTRAL	6	7	4	1	5,791	6,732	2	22	1	2	1	-
Ky	-	3	1	-	607	783	-	4	-	-	-	-
Tenn	-	2	1	-	1,911	2,535	1	10	-	-	-	-
Ala	3	-	2	-	1,944	1,862	1	5	-	-	-	-
Miss	3	2	-	1	1,329	1,452	-	3	1	2	1	-
W S CENTRAL	46	6	4	-	8,696	9,911	28	27	3	9	1	4
Ark	3	-	-	-	1,039	956	-	-	-	-	-	-
La	31	1	-	-	1,474	1,837	1	7	-	1	-	-
Okla	11	1	1	-	1,007	1,160	9	5	-	1	1	-
Tex	1	4	3	-	5,176	6,156	18	15	3	7	-	4
MOUNTAIN	57	3	4	-	2,177	2,409	56	28	9	2	-	-
Mont	1	-	-	-	47	61	1	-	1	-	-	-
Idaho	1	-	-	-	73	74	1	2	-	-	-	-
Wyo	1	-	-	-	21	49	-	3	-	-	-	-
Colo	34	-	-	-	452	608	6	4	4	1	-	-
N Mex	8	1	1	-	233	272	9	3	1	-	-	-
Ariz	3	-	3	-	763	703	19	1	3	-	-	-
Utah	5	-	-	-	95	111	9	6	-	1	-	-
Nev	4	2	-	-	493	531	11	9	-	-	-	-
PACIFIC	487	20	5	-	12,820	11,354	191	146	8	19	-	19
Wash	11	-	1	-	742	916	73	58	2	7	-	-
Oreg	5	-	-	-	470	442	14	10	1	1	-	-
Calif	455	12	4	-	11,227	9,555	98	71	5	10	-	17
Alaska	2	-	-	-	260	322	6	7	-	1	-	-
Hawaii	14	8	-	-	121	119	-	-	-	-	-	2
Guam	-	-	-	-	26	5	-	-	-	-	-	-
P R	-	2	-	-	232	182	7	6	-	7	-	-
V I	-	-	-	-	24	18	-	1	-	-	-	-
Pac. Trust Terr	-	-	-	-	23	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	12	-	-	-	-	-	-	-

N: Not notifiable U: Unavailable

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending February 7, 1987 and February 1, 1986 (5th Week)

Reporting Area	Malaria	Measles (Rubeola)					Menin-gococcal Infections	Mumps		Pertussis			Rubella		
		Indigenous		Imported *		Total									
	Cum. 1987	1987	Cum. 1987	1987	Cum. 1987	Cum. 1986	Cum. 1987	1987	Cum. 1987	1987	Cum. 1987	Cum. 1986	1987	Cum. 1987	Cum. 1986
UNITED STATES	56	20	91	3	20	116	317	430	1,210	35	160	154	-	20	23
NEW ENGLAND	6	-	-	-	5	-	30	2	6	1	3	14	-	-	-
Maine	-	-	-	-	-	-	3	-	-	-	-	1	-	-	-
N.H.	-	-	-	-	-	-	5	-	4	-	1	7	-	-	-
Vt.	-	-	-	-	5	-	3	1	1	-	-	-	-	-	-
Mass.	4	-	-	-	-	-	12	-	-	1	1	4	-	-	-
R.I.	2	-	-	-	-	-	3	-	-	-	-	1	-	-	-
Conn.	-	-	-	-	-	-	4	1	1	-	1	1	-	-	-
MID. ATLANTIC	2	6	18	2 †	14	13	35	2	30	7	21	28	-	-	7
Upstate N.Y.	1	-	-	1 †	2	2	20	1	9	5	15	19	-	-	6
N.Y. City	-	6	18	-	-	11	2	-	-	-	-	-	-	-	-
N.J.	-	-	-	- §	1	-	-	1	9	1	1	-	-	-	1
Pa.	1	-	-	1 †	11	-	13	-	12	1	5	9	-	-	-
E.N. CENTRAL	1	2	23	-	-	38	34	355	929	5	21	40	-	1	1
Ohio	1	-	-	-	-	-	18	9	24	3	15	11	-	-	-
Ind.	-	-	-	-	-	-	-	76	109	-	-	3	-	-	-
Ill.	-	-	1	-	-	17	-	245	625	-	-	10	-	-	-
Mich.	-	2	22	-	-	-	15	24	112	2	5	1	-	1	-
Wis.	-	-	-	-	-	21	1	1	59	-	1	15	-	-	1
W.N. CENTRAL	1	-	-	-	-	42	22	21	55	2	17	18	-	-	-
Minn.	-	-	-	-	-	-	3	13	18	-	2	10	-	-	-
Iowa	-	-	-	-	-	-	2	3	22	-	2	2	-	-	-
Mo.	1	-	-	-	-	-	7	-	2	2	7	1	-	-	-
N. Dak.	-	-	-	-	-	-	1	-	-	-	1	2	-	-	-
S. Dak.	-	-	-	-	-	-	1	5	8	-	1	-	-	-	-
Nebr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kans.	-	-	-	-	-	42	8	-	5	-	4	3	-	-	-
S. ATLANTIC	9	-	-	-	-	-	62	5	13	7	35	17	-	-	1
Del.	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Md.	1	-	-	-	-	-	8	2	5	-	-	4	-	-	-
D.C.	1	-	-	-	-	-	1	-	-	-	-	-	-	-	-
Va.	2	-	-	-	-	-	14	-	-	3	16	3	-	-	-
W. Va.	-	-	-	-	-	-	-	2	4	-	2	-	-	-	-
N.C.	1	-	-	-	-	-	5	1	2	4	15	4	-	-	-
S.C.	-	-	-	-	-	-	5	-	-	-	-	1	-	-	-
Ga.	2	-	-	-	-	-	17	-	1	-	2	2	-	-	-
Fla.	1	-	-	-	-	-	12	-	1	-	-	3	-	-	1
E.S. CENTRAL	1	-	-	-	-	-	18	22	120	-	3	5	-	2	1
Ky.	-	-	-	-	-	-	3	16	45	-	1	1	-	2	1
Tenn.	-	-	-	-	-	-	6	6	74	-	-	1	-	-	-
Ala.	-	-	-	-	-	-	7	-	1	-	-	3	-	-	-
Miss.	1	-	-	-	-	-	2	-	-	-	2	-	-	-	-
W.S. CENTRAL	2	-	-	-	-	-	22	7	13	3	5	1	-	-	1
Ark.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La.	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
Okla.	-	-	-	-	-	-	7	N	N	3	5	1	-	-	-
Tex.	2	-	-	-	-	-	13	7	13	-	-	-	-	-	1
MOUNTAIN	1	1	1	1	1	8	16	8	15	6	9	12	-	1	-
Mont.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	-	-	-	-	-	-	1	-	-	-	-	2	-	-	-
Wyo.	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Colo.	-	-	-	-	-	-	3	1	2	6	6	2	-	-	-
N. Mex.	-	1	1	-	-	8	1	N	N	-	1	4	-	-	-
Ariz.	-	-	-	1 †	1	-	10	6	12	-	-	4	-	-	-
Utah	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
Nev.	1	-	-	-	-	-	1	1	1	-	-	-	-	-	-
PACIFIC	33	11	49	-	-	15	78	8	29	4	46	19	-	16	12
Wash.	2	-	-	-	-	-	17	2	6	-	5	6	-	-	-
Oreg.	-	-	1	-	-	-	10	N	N	-	8	-	-	1	-
Calif.	31	11	48	-	-	14	50	6	22	2	30	11	-	14	12
Alaska	-	-	-	-	-	-	1	-	-	1	1	1	-	-	-
Hawaii	-	-	-	-	-	1	-	-	1	1	2	1	-	1	-
Guam	-	-	1	-	-	-	1	-	-	-	-	-	-	-	-
P.R.	-	-	-	-	-	-	-	-	-	2	4	2	-	-	-
V.I.	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
Pac. Trust Terr.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Amer. Samoa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

*For measles only, imported cases includes both out-of-state and international importations.

N: Not notifiable U: Unavailable †International §Out-of-state

TABLE III. (Cont'd.) Cases of specified notifiable diseases, United States, weeks ending February 7, 1987 and February 1, 1986 (5th Week)

Reporting Area	Syphilis (Civilian) (Primary & Secondary)		Toxic-shock Syndrome	Tuberculosis		Tula-remia	Typhoid Fever	Typhus Fever (Tick-borne) (RMSF)	Rabies, Animal
	Cum 1987	Cum 1986	1987	Cum 1987	Cum 1986	Cum 1987	Cum 1987	Cum 1987	Cum 1987
UNITED STATES	2,906	2,383	8	1,521	1,382	9	16	6	273
NEW ENGLAND	45	60	-	27	47	-	2	-	-
Maine	-	3	-	1	6	-	-	-	-
N H	-	1	-	1	3	-	-	-	-
Vt	-	3	-	1	2	-	-	-	-
Mass	30	34	-	6	19	-	2	-	-
R I	-	1	-	-	-	-	-	-	-
Conn	15	18	-	18	17	-	-	-	-
MID ATLANTIC	391	340	-	299	277	-	1	-	40
Upstate N Y	6	18	-	51	45	-	1	-	4
N Y City	257	238	-	139	130	-	-	-	-
N J	57	63	-	62	65	-	-	-	-
Pa	71	21	-	47	37	-	-	-	36
E N CENTRAL	51	71	1	227	207	1	3	1	7
Ohio	7	7	-	34	25	1	2	1	-
Ind	6	18	-	3	16	-	-	-	-
Ill	22	29	-	103	109	-	-	-	2
Mich	11	6	1	82	45	-	1	-	-
Wis	5	11	-	5	12	-	-	-	5
W N CENTRAL	15	17	-	45	19	3	2	-	64
Minn	4	3	-	6	2	-	-	-	15
Iowa	2	3	-	5	2	2	-	-	20
Mo	9	9	-	25	13	1	2	-	2
N Dak	-	2	-	1	-	-	-	-	7
S Dak	-	-	-	2	-	-	-	-	14
Nebr	-	-	-	3	-	-	-	-	2
Kans	-	-	-	3	1	-	-	-	4
S ATLANTIC	973	874	1	304	282	1	3	1	56
Del	10	2	-	-	-	-	-	-	-
Md	49	41	-	29	11	-	-	-	13
D C	22	33	-	12	17	-	-	-	1
Va	32	54	-	35	10	1	-	-	22
W Va	-	3	-	12	7	-	1	-	4
N C	60	53	-	36	38	-	1	-	-
S C	72	86	-	44	40	-	-	1	2
Ga	175	139	-	19	28	-	-	-	13
Fla	553	264	1	117	111	-	1	-	-
E S CENTRAL	208	173	-	145	143	-	-	1	17
Ky	-	12	-	27	44	-	-	-	13
Tenn	75	59	-	-	37	-	-	-	-
Ala	54	58	-	59	62	-	-	-	4
Miss	79	44	-	59	-	-	-	1	-
W S CENTRAL	340	493	-	109	110	3	-	3	48
Ark	18	19	-	7	10	-	-	-	13
La	50	80	-	25	45	-	-	-	1
Okla	18	18	-	13	6	3	-	3	-
Tex	254	376	-	64	49	-	-	-	34
MOUNTAIN	74	81	2	29	28	1	-	-	18
Mont	3	-	-	-	-	-	-	-	7
Idaho	1	1	-	2	1	-	-	-	-
Wyo	-	-	-	-	-	-	-	-	9
Colo	8	26	-	-	1	-	-	-	-
N Mex	7	10	-	8	6	-	-	-	-
Ariz	35	29	-	18	14	1	-	-	3
Utah	-	3	2	-	-	-	-	-	-
Nev	20	12	-	3	6	-	-	-	-
PACIFIC	809	454	4	336	289	-	5	-	24
Wash	-	18	2	11	18	-	-	-	-
Oreg	13	15	-	13	9	-	-	-	-
Calif	795	414	2	283	244	-	5	-	23
Alaska	-	-	-	7	5	-	-	-	1
Hawaii	1	7	-	22	13	-	-	-	-
Guam	-	1	-	2	-	-	-	-	-
P R	88	63	-	15	25	-	-	-	-
V I	-	-	-	-	-	-	-	-	5
Pac Trust Terr	-	-	-	1	-	-	3	-	-
Amer Samoa	-	-	-	-	-	-	-	-	-

U: Unavailable

TABLE IV. Deaths in 121 U.S. cities,* week ending February 7, 1987 (5th Week)

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
NEW ENGLAND	610	448	110	34	7	11	69
Boston, Mass.	200	132	41	14	5	8	34
Bridgeport, Conn.	47	34	10	3	-	-	4
Cambridge, Mass.	30	26	4	-	-	-	7
Fall River, Mass.	27	25	1	-	1	-	-
Hartford, Conn.	29	18	6	6	-	1	1
Lowell, Mass.	27	18	6	3	-	-	5
Lynn, Mass.	13	11	2	-	-	-	1
New Bedford, Mass.	27	24	3	-	-	-	1
New Haven, Conn.	56	36	14	5	1	-	2
Providence, R.I.	31	26	5	-	-	-	2
Somerville, Mass.	5	5	-	-	-	-	-
Springfield, Mass.	30	22	6	2	-	-	4
Waterbury, Conn.	35	28	6	1	-	-	3
Worcester, Mass.	53	45	6	-	-	2	5
MID ATLANTIC	2,915	1,958	606	231	64	58	162
Albany, N.Y.	55	40	11	2	2	-	-
Allentown, Pa.	24	19	5	-	-	-	2
Buffalo, N.Y.	135	93	30	4	5	3	16
Camden, N.J.	37	19	14	2	1	1	2
Elizabeth, N.J.	29	25	2	1	1	-	-
Erie, Pa †	48	41	6	1	1	-	3
Jersey City, N.J.	51	34	10	4	2	1	2
N.Y. City, N.Y.	1,541	1,005	332	163	24	17	76
Newark, N.J.	46	26	10	6	4	-	7
Paterson, N.J.	43	21	8	3	2	9	1
Philadelphia, Pa.	465	307	100	28	10	20	32
Pittsburgh, Pa †	69	45	20	1	2	1	1
Reading, Pa.	32	26	3	2	-	1	6
Rochester, N.Y.	143	113	19	5	4	2	4
Schenectady, N.Y.	23	20	2	1	-	-	2
Scranton, Pa †	24	20	3	1	-	-	-
Syracuse, N.Y.	64	45	13	3	3	-	4
Trenton, N.J.	38	20	11	3	1	3	1
Utica, N.Y.	16	13	2	-	1	-	1
Yonkers, N.Y.	33	25	6	1	1	-	3
E.N. CENTRAL	2,363	1,569	504	156	60	74	89
Akron, Ohio	62	47	10	2	3	-	-
Canton, Ohio	39	30	8	-	-	1	4
Chicago, Ill §	564	362	125	45	10	22	16
Cincinnati, Ohio	138	94	30	6	3	5	12
Cleveland, Ohio	175	99	48	19	5	4	4
Columbus, Ohio	124	83	23	13	1	4	4
Dayton, Ohio	133	85	38	6	3	1	3
Detroit, Mich.	266	161	54	24	14	13	9
Evansville, Ind.	46	40	4	2	-	-	1
Fort Wayne, Ind.	56	39	11	2	1	3	1
Gary, Ind.	15	7	4	2	1	1	-
Grand Rapids, Mich.	44	31	9	1	2	1	2
Indianapolis, Ind.	188	127	43	8	4	6	-
Madison, Wis.	44	30	12	-	2	-	1
Milwaukee, Wis.	150	106	29	10	2	3	2
Peoria, Ill.	41	27	8	1	2	3	4
Rockford, Ill.	43	28	9	2	2	2	7
South Bend, Ind.	61	47	9	5	-	-	3
Toledo, Ohio	120	82	24	6	4	5	12
Youngstown, Ohio	54	44	6	3	1	-	4
W.N. CENTRAL	850	615	160	42	13	20	108
Des Moines, Iowa	53	38	8	6	-	1	7
Duluth, Minn.	27	20	6	-	-	1	2
Kansas City, Kans.	36	19	9	3	3	2	-
Kansas City, Mo.	126	91	26	2	2	5	19
Lincoln, Nebr.	37	27	7	1	1	1	5
Minneapolis, Minn.	160	117	24	14	3	2	10
Omaha, Nebr.	121	80	34	4	-	3	6
St. Louis, Mo.	146	109	26	6	2	3	49
St. Paul, Minn.	61	48	8	3	1	1	3
Wichita, Kans.	83	66	12	3	1	1	7

Reporting Area	All Causes, By Age (Years)						P&I** Total
	All Ages	≥65	45-64	25-44	1-24	<1	
S. ATLANTIC	1,648	1,035	371	147	31	63	80
Atlanta, Ga.	199	110	50	25	2	12	10
Baltimore, Md.	254	165	57	21	3	8	11
Charlotte, N.C.	81	54	15	7	2	3	5
Jacksonville, Fla.	134	89	28	12	2	2	7
Miami, Fla.	137	81	31	16	4	5	2
Norfolk, Va.	74	42	21	3	2	6	2
Richmond, Va.	135	84	39	11	-	1	8
Savannah, Ga.	94	65	18	5	3	3	12
St. Petersburg, Fla.	139	116	14	5	1	3	4
Tampa, Fla.	85	51	24	3	3	4	5
Washington, D.C.	293	158	72	38	9	16	13
Wilmington, Del.	23	20	2	1	-	-	1
E.S. CENTRAL	993	657	210	58	38	30	73
Birmingham, Ala.	169	98	42	13	14	2	2
Chattanooga, Tenn.	65	47	11	2	1	4	7
Knoxville, Tenn.	83	57	18	5	1	2	9
Louisville, Ky.	114	73	29	5	3	4	11
Memphis, Tenn.	256	168	58	14	11	5	22
Mobile, Ala.	91	65	15	4	2	5	9
Montgomery, Ala.	66	49	8	4	3	2	4
Nashville, Tenn.	149	100	29	11	3	6	9
W.S. CENTRAL	1,508	935	351	127	46	49	76
Austin, Tex.	55	37	12	5	-	1	5
Baton Rouge, La.	59	38	6	4	5	6	4
Corpus Christi, Tex.	54	34	12	5	1	2	3
Dallas, Tex.	262	155	66	23	9	9	8
El Paso, Tex.	61	43	13	4	-	1	6
Fort Worth, Tex.	92	63	20	4	3	2	3
Houston, Tex. §	314	174	79	36	14	11	8
Little Rock, Ark.	63	41	16	4	1	1	7
New Orleans, La.	144	79	45	15	3	2	-
San Antonio, Tex.	209	129	50	14	7	9	17
Shreveport, La.	91	69	12	6	2	2	6
Tulsa, Okla.	104	73	20	7	1	3	9
MOUNTAIN	736	495	149	43	21	28	33
Albuquerque, N.Mex.	83	52	20	8	1	2	2
Colo. Springs, Colo.	42	26	8	2	3	3	5
Denver, Colo.	106	69	21	10	1	5	1
Las Vegas, Nev.	94	67	21	3	2	1	5
Ogden, Utah	36	25	6	-	2	3	8
Phoenix, Ariz.	157	98	35	10	5	9	4
Pueblo, Colo.	32	24	4	2	1	1	6
Salt Lake City, Utah	50	31	11	2	3	3	-
Tucson, Ariz.	136	103	23	6	3	1	2
PACIFIC	2,090	1,397	400	175	53	58	138
Berkeley, Calif.	20	13	4	2	-	1	4
Fresno, Calif.	86	66	10	5	3	2	8
Glendale, Calif.	30	27	2	1	-	-	-
Honolulu, Hawaii	84	53	23	4	2	2	5
Long Beach, Calif.	53	36	5	4	3	5	4
Los Angeles, Calif.	624	419	127	46	13	13	34
Oakland, Calif.	44	30	7	5	1	1	2
Pasadena, Calif.	48	30	7	5	1	5	2
Portland, Oreg.	136	97	30	5	1	3	6
Sacramento, Calif.	137	86	34	9	5	2	11
San Diego, Calif.	194	123	37	23	8	3	22
San Francisco, Calif.	165	93	28	32	5	7	4
San Jose, Calif.	181	132	39	5	3	2	20
Seattle, Wash.	175	118	27	18	5	7	6
Spokane, Wash.	61	38	14	6	1	2	10
Tacoma, Wash.	52	36	6	5	2	3	2
TOTAL	13,713††	9,107	2,861	1,013	333	391	828

* Mortality data in this table are voluntarily reported from 121 cities in the United States, most of which have populations of 100,000 or more. A death is reported by the place of its occurrence and by the week that the death certificate was filed. Fetal deaths are not included.

** Pneumonia and influenza.

† Because of changes in reporting methods in these 3 Pennsylvania cities, these numbers are partial counts for the current week. Complete counts will be available in 4 to 6 weeks.

†† Total includes unknown ages.

§ Data not available. Figures are estimates based on average of past 4 weeks.

Heavier Drinking — Continued

every day. This cut-off is not intended to identify alcohol abusers, but rather individuals who were consuming alcohol with regularity at the time of the surveys. Extensive epidemiologic research has indicated that those chronically exposed to alcohol intakes at or above this cut-off level contribute a disproportionate share of alcohol-related morbidity and mortality (*2*).

Table 3 presents the sex-specific prevalence of heavier drinking in the 22 states. The distribution of these prevalences is summarized in the "box-plots" (*3*) in Figure 1. These plots show the location of the median (50th percentile) of the distribution of state-specific prevalences, the upper and lower quartiles, and the extreme highest and lowest prevalence estimates observed among the 22 states. Figure 1 indicates that the median state-specific

FIGURE 1. Box-plot summaries of the sex-specific distribution of heavier drinking prevalences from 22 states participating in the 1985 Behavioral Risk Factor Surveys

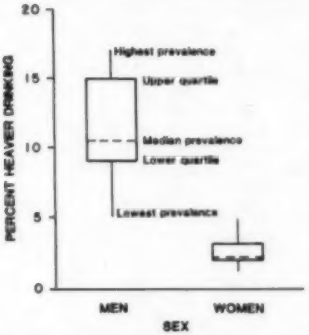

TABLE 3. Sex-specific heavier drinking prevalences (percentages), by state — 1985 Behavioral Risk Factor Surveys

State	Men			Women		
	No.	%	(95% CI*)	No.	%	(95% CI*)
Arizona	480	15	(11-18)	695	4	(3-6)
California	597	14	(11-17)	775	3	(1-4)
Connecticut	400	15	(11-19)	583	4	(2-6)
District of Columbia	283	11	(8-15)	443	2	(1-3)
Florida	311	15	(10-19)	465	5	(2-7)
Georgia	353	11	(7-15)	465	1	(0.2-3)
Idaho	448	9	(6-12)	731	3	(1-4)
Illinois	503	17	(14-20)	645	5	(3-8)
Indiana	474	9	(6-11)	708	2	(1-3)
Kentucky	325	9	(5-12)	478	2	(1-3)
Minnesota	1,026	12	(9-14)	1,360	2	(1-3)
Montana	490	10	(7-13)	693	2	(1-2)
North Carolina	641	9	(6-11)	887	1	(1-2)
North Dakota	261	5	(2-8)	364	2	(1-4)
New York	484	15	(12-19)	690	3	(2-4)
Ohio	462	13	(10-17)	694	2	(1-4)
Rhode Island	542	10	(7-13)	735	3	(1-4)
South Carolina	458	9	(6-12)	758	2	(1-3)
Tennessee	415	10	(7-13)	792	1	(0.2-1)
Utah	451	5	(3-7)	711	2	(1-3)
Wisconsin	435	16	(12-19)	530	4	(2-5)
West Virginia	466	8	(5-11)	711	1	(0.3-2)

*Confidence interval.

Heavier Drinking — Continued

prevalence of heavier drinking is several fold higher in men than in women and that the large majority of state-specific prevalence estimates for men do not overlap the distribution of estimates for women. This figure also shows that the variation in state-specific prevalence estimates of heavier drinking is much greater for men than for women.

Table 4 presents the age-specific prevalence of heavier drinking among men in the 22 states. (The number of women reporting heavier drinking in the three age groups in these states was too low to allow reliable age-specific prevalence estimates for women to be produced.) In most of the states, the prevalence of heavier drinking among men declined with increasing age. The distribution of these prevalences is summarized in Figure 2, which also indicates that there is considerable overlap in the age-specific prevalence distributions of heavier drinking among men in these states.

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Editorial Note: A total of 25,221 persons were interviewed by telephone in the 22 states in 1985. In this group only 7% reported regularly having two or more drinks per day. Hence, the

TABLE 4. Heavier drinking prevalences (percentages) among men, by age and state — 1985 Behavioral Risk Factor Surveys

State	Age 18-34 %	18-34 (95% CI*)	35-54 %	35-54 (95% CI*)	≥55 %	≥55 (95% CI*)
Arizona	23	(17-29)	7	(3-11)	10	(5-14)
California	13	(8-18)	14	(10-19)	15	(8-21)
Connecticut	17	(9-24)	17	(10-23)	11	(5-17)
District of Columbia	12	(6-18)	16	(8-25)	†	
Florida	11	(5-17)	15	(8-23)	18	(8-28)
Georgia	16	(9-23)	7	(1-14)	†	
Idaho	13	(7-18)	9	(4-13)	4	(0.1-8)
Illinois	18	(12-24)	20	(14-26)	11	(6-16)
Indiana	14	(8-20)	4	(1-7)	5	(1-9)
Kentucky	9	(3-15)	12	(5-18)	4	(1-8)
Minnesota	15	(11-18)	10	(6-14)	8	(4-11)
Montana	12	(7-18)	8	(4-12)	9	(4-15)
North Carolina	12	(7-16)	6	(3-8)	6	(2-11)
North Dakota	8	(3-13)		†		†
New York	21	(14-29)	12	(7-16)	11	(6-17)
Ohio	18	(11-25)	12	(6-17)	8	(3-13)
Rhode Island	13	(8-18)	11	(6-16)	5	(2-8)
South Carolina	9	(4-14)	9	(4-15)	7	(1-12)
Tennessee	14	(8-20)	8	(3-12)	5	(1-10)
Utah	5	(2-8)	5	(1-9)	†	
Wisconsin	21	(15-28)	16	(10-22)	7	(2-12)
West Virginia	14	(7-20)	6	(2-10)	3	(0.1-6)

*Confidence interval.

†The point prevalence estimates are statistically unreliable because the number of respondents reporting chronic drinking was <5.

Heavier Drinking — Continued

cut-off defined by "two or more drinks per day" appears to identify a level of alcohol exposure higher than that experienced by the large majority of adults living in these states. Similar estimates of the prevalence of heavier drinking have been reported from a recent, nationally representative survey based on household-interviews (*4*).

Although a variety of epidemiological studies indicate that there may be some health benefits associated with moderate drinking (*5*), such a level of drinking is difficult to quantify for the purpose of prudent health recommendations. In addition, given the known health effects and current estimated costs of alcohol abuse in the United States, it is not possible to justify any recommendations that imply that individuals should increase their current level of alcohol consumption (*5*).

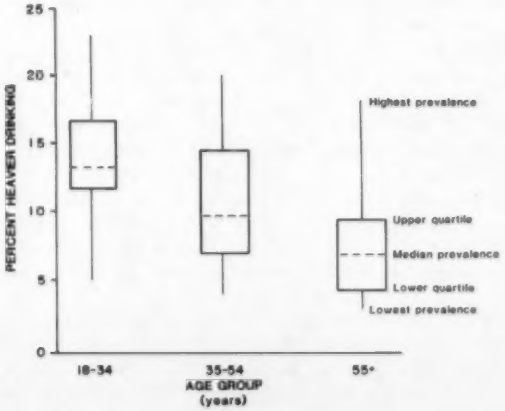
This report and another recent study (*4*) show that women have a lower prevalence of heavier drinking than men. However, recent clinical and epidemiological studies suggest that, even when women consume less alcohol than men, they experience a more rapid and severe onset of alcohol-related disease than men (*6*). Hence the control of heavier drinking among women should remain a priority in state-based disease prevention programs.

This report demonstrates that there is a trend among men toward lower prevalence of heavier drinking with increasing age. However, this analysis was based on cross-sectional data. Hence, the observed trend could be influenced by differential mortality of heavier drinkers as well as by differences in drinking habits related to the age cohorts chosen. It is also interesting to note that in some states the observed prevalence of heavier drinking among older men is similar to that among younger men.

The large variation in heavier drinking prevalences among men across states suggests that a single public health intervention approach may be less appropriate for men than for women. This heterogeneity may be due to differences across states in socioeconomic and cultural determinants of drinking among men, such as levels of unemployment, urbanization, or dominant social mores.

Because of the small age-specific sample sizes in the individual state's surveys, it is difficult to show the statistical significance of differences in prevalence estimates among states. However, this should not limit examination of the public health significance of marked dif-

FIGURE 2. Box-plot summaries of the age-specific distribution of heavier drinking prevalences among men from 22 states participating in the 1985 Behavioral Risk Factor Surveys



Heavier Drinking — Continued

ferences in prevalence among states. For example, one-quarter of the states now report the prevalence of heavier drinking to be below 12% among men 18-34 years of age (lower quartile; Figure 2). States in the upper quartile have prevalences of heavier drinking that are half again or more in excess of this achievable level (17+%). With the establishment of the state-based Behavioral Risk Factor Surveillance System, states can now monitor changes over time in the prevalence of heavier drinking in their total populations as well as in relevant age- and sex-specific subgroups. Regular surveillance of heavier drinking allows policy makers at the state level to evaluate the progress of efforts in meeting acceptable prevalence targets.

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Epidemiologic Notes and Reports

Salmonellosis in a School System — Oklahoma

Between April 2 and April 6, 1986, an outbreak of salmonellosis occurred among 2,130 students and employees of a public school system in a small Oklahoma community. A sample of 420 persons were interviewed at the four schools. Forty (9.5%) of those interviewed developed diarrhea (defined as three or more loose stools in 24 hours) during the time of the outbreak. Based on extrapolation, the total number of cases was estimated at 202. Accompanying symptoms included nausea (87.5%), vomiting (72.5%), abdominal cramps (85%), and fever (77.5%). At least 22 students and employees were hospitalized with gastroenteritis.

Salmonella was isolated from 32 patients with outbreak-related illnesses—*S. heidelberg*, from 27; and *S. stanley*, from five. The attack rate was slightly greater for students (39/401, 9.7%) than for teachers (1/19, 5.2%), but did not differ by age, sex, grade, or school attended. Of the 33 cafeteria workers, 11 (33.3%) had diarrheal illness, all with onsets after April 2. Illness was strongly associated with eating chicken from the school cafeteria on April 2 (relative risk [RR] = 5.6, 95% confidence interval [CI] = 1.9-27.5). No other foods were implicated.

All of the food served at the four schools was prepared at one location. A review of food-handling procedures revealed that the frozen chicken was left to thaw at room temperature on March 31. On April 1, part of the chicken was placed in water-filled pans and cooked in an oven for 2 hours at a dial setting of 177 C (350 F). The oven heat was then turned off, and the chicken was left overnight in the warm oven. The remainder of the chicken was cooked for 2 hours in a steam cooker and then left in the device overnight at the lowest possible setting.

The oven was tested by cooking a pan of baked beans for the same length of time and at the same temperature used for the chicken. When the beans were removed from the oven, the temperature at the edge of the pan was 49-60 C (120-140 F); however, it was only 29 C (84 F) at the center. In a similar test of the steam cooker, the temperature rose to 93 C

Salmonellosis – Continued

(200 F) in 1 hour but fell to 43 C (110 F) at the lowest setting. When interviewed, the cafeteria workers were unable to identify any probable errors in food-handling procedures.

Control measures included emphasizing strict attention to hand washing and excluding cafeteria workers with diarrhea from food handling until they were asymptomatic. Cafeteria workers, many of whom had little training, received formal instruction in food service. Emphasis was placed on thawing all frozen meat products in a refrigerator, using a meat thermometer to ensure thorough cooking (internal temperature >74 C [165 F]), storing foods at temperatures high enough (>60 C [140 F]) or low enough (<7 C [45 F]) to ensure that bacteria will not multiply, and serving food soon after cooking.

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Editorial Note: Outbreaks of salmonellosis can be extremely costly. In this Oklahoma outbreak, medical expenses filed with the school's insurer totaled $40,000, and it is likely that these claims represent only a fraction of the economic costs of the outbreak. The cost of medical care and lost income per case in a 1976 outbreak of *S. heidelberg* infection was calculated at $645, or $1,290 in 1985 dollars (*1,2*). In 1984, the overall economic impact of salmonellosis, including the cost of the large number of unreported cases, was estimated at between $1.9 and $2.3 billion annually (*3*). Based on the 56,657 *Salmonella* isolates reported to CDC in 1985 (*4*), the minimum medical costs and lost income from *Salmonella* infections in the United States for that year were estimated at over $73 million.

Poultry in the United States is frequently contaminated with *Salmonella*, and improperly cooked or handled poultry is frequently implicated in foodborne outbreaks (*5*). In a survey of 15 poultry processing plants, from 2.5%-77.5% of the ready-to-market chicken carcasses contained *Salmonella*. *S. heidelberg* comprised 24% of all isolates and was the most frequently isolated serotype (*6*).

Between 1973 and 1984, CDC received 2,984 reports of foodborne outbreaks in which the vehicle was identified; poultry was implicated in 273 (9.0%) of these outbreaks. One hundred and ninety of these 2,984 outbreaks occurred in schools. Poultry was implicated in 25.2% of these school outbreaks, with turkey accounting for 20.0% of them, and chicken, for 5.2%. The contributing factors most frequently reported were inadequate storage and cooking of the poultry. Poultry was implicated in 8.5% of outbreaks not occurring in schools.

Lack of basic knowledge about food safety can result in large and costly outbreaks of foodborne illness. Nonetheless, the required training for school lunchroom supervisors and employees varies widely from state to state. Laws that require adequate training of food-service workers employed by schools may prevent many similar outbreaks.

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Erratum — Vol. 36, No. 4

p. 59 In the article entitled "Influenza A(H1N1) Associated With Mild Illness in a Nursing Home—Maine", the footnote on page 59 should read: "[1]Influenza A(H1N1) stopped circulating in 1957 and reemerged in 1977 (*1*)."

FIGURE I. Reported measles cases — United States, weeks 01-04, 1987

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